

Appl. No. 09/988,994
Amendment dated August 31, 2004
Reply to Office Action of June 3, 2004

REMARKS

Claims 15-37 are pending in this application. For purposes of expedition, base claims 15, 21, 25 and 31 have been amended in several particulars to further distinguish over cited prior art, while claims 36-37 have been newly added to alternatively capture the allowable subject matter of Applicants' disclosed invention over the cited prior art.

Claims 15-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over what the Examiner alleges as "Applicant's Admitted Prior Art" in view of Endsley et al., U.S. Patent No. 6,005,613, for reasons stated on pages 4-6 of the Office Action (Paper No. 26). As a preliminary matter, Applicants note that the Office Action (Paper No. 26) is incomplete because the Examiner has failed to identify the status of claims 31-35 as previously presented in the Amendment filed on March 8, 2004. In addition, Applicants also disappoint at the way in which the Examiner has selectively incorporated features of Endsleys '613 into a restrictive environment of FIGs. 4A-4E (Applicant's Admitted Prior Art), and note that, given the rationale newly provided on pages 2-3 of the Office Action (Paper No. 26), the Examiner has not fully appreciated the essence of Applicants' disclosed invention as embodied in each of base claims 15, 21 and 25 [as well as claim 31], when Endsley '613 is blindly incorporated into what the Examiner alleges as "Applicant's Admitted Prior Art" without any suggestion from either Endsley '613 or "Applicant's Admitted Prior Art" in order to allegedly arrive at Applicants' claims 15-30.

At the very outset, Applicants also note that, in order to establish a *prima facie* case of obviousness under 35 U.S.C. §103, the Examiner must show that the prior art reference (or references when combined) must teach or suggest all the claim

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limitations, and that there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings, provided with a reasonable expectation of success, in order to arrive at the Applicants' claimed invention. The requisite motivation must stem from some teaching or suggestion to make the claimed combination must be found in the prior art, and not based on Applicants' disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 2143. All the claim limitations must be disclosed or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). Moreover, "obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching, suggestion or incentive supporting the combination." ACS Hospital System, Inc v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 933 (Fed. Cir. 1984). The Examiner must point to something in the prior art that suggests in some way a modification of a particular reference or a combination of references in order to arrive at Applicants' claimed invention. Absent such a showing, the Examiner has improperly used Applicants' disclosure as an instruction book on how to reconstruct to the prior art to arrive at Applicants' claimed invention. Furthermore, any deficiencies in the cited references cannot be remedied with conclusions about what is "basic knowledge" or "common knowledge". In re Lee, 61 USPQ 2d 1430 (Fed. Cir. 2002).

In the present situation, neither of what the Examiner alleges as "Applicant's Admitted Prior Art" nor Endsley '613, whether taken individually or in combination, discloses key features of Applicants' base claims 15, 21 and 25, including, for

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example, the "single synthesized image data ... generated by one color image and the same color image obtained by shifting by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction, and that such "single synthesized image data ... output as single monochromatic image data". Moreover, there is no suggestion anywhere in the cited prior art to support the combination of references in order to arrive at Applicants' claimed invention. Therefore, Applicants respectfully traverse the rejection and request the Examiner to reconsider and withdraw this rejection for the following reasons.

By way of review, the purpose of Applicants' disclosed invention, as described on page 6, lines 5-8 of Applicants' specification, is to provide an image processing apparatus and method for generating a monochromatic image of high resolution in a short time using the image shift scheme. In order to achieve that purpose, a plurality of image data of selected only one color (for example, green) exclusive of other non-selected colors, are obtained by shifting an image of an object by a predetermined pitch. The plurality of image data of the selected only one color exclusive of other non-selected colors are then synthesized to form and output a single monochromatic image data of high resolution.

For example, base claim 15 has been amended to define an image processing apparatus comprising, *inter alia*:

a color imaging device including photo-detectors and a color filter arranged on the imaging surface in two-dimensions, for performing photoelectric conversion of the image of the object formed by the imaging optical system to obtain image data of the image of the object extracted through selected only one color of the color filter exclusive of other non-selected colors of the color filter;

shift drive means for shifting the image optical system and the photo-detectors relative to each other by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined

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direction in order to obtain image data of the selected only one color having a required resolution; and

a control unit for generating **single synthesized image data** using image data of the image of the object obtained through selected only one color of the color filter exclusive of other non-selected colors of the color filter of the color imaging device, and image data of the image of the object obtained through the selected only one color of the color filter exclusive of other non-selected colors of the color filter when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction;

wherein the control unit includes output means for outputting the single synthesized image data as single monochromatic image data.

Likewise, independent claim 25 defines the same image processing apparatus in terms of means-plus-function clauses.

Similarly, base method claim 21 defines an image processing method comprising:

forming an image of an object on an imaging surface of a color imaging device by an imaging optical system;

extracting **first image data** of the image of the object of a selected only one color exclusive of other non-selected colors available from an image of the object formed on the imaging surface;

shifting the image of the object formed on the imaging surface by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction in order to obtain image data of the selected only one color having a required resolution;

extracting **second image data** of the image of the object of the selected only one color exclusive of other non-selected colors available from an image of the object obtained after shifting is performed;

synthesizing the first and second image data to generate single synthesized image data;

outputting the single synthesized image data as single monochromatic image data.

As expressly defined in base claims 15, 21 and 25, two image data (a) and (b) of only one color are synthesized to generate single monochromatic image data of

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selected only one color exclusive of other non-selected colors in the color filter,

Including:

- (a) an image data of the image of the object obtained through selected only one color of the color filter exclusive of other non-selected colors of the color filter, and
- (b) an image data of an image of the object obtained through the above-selected only one color of the color filter exclusive of other non-selected colors of the color filter, when the imaging optical system and the photo-detectors are shifted relative to each other by the shift drive means by a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction.

More importantly, Applicants' base claims 15, 21 and 25 require shifting the imaging optical system and the photo-detectors relative to each other in increments of a distance corresponding to a predetermined pitch on the imaging surface in a predetermined direction in order to obtain image data of the selected only one color having a required resolution. According to the present invention, a color filter known as the Bayer scheme is used. For example, a single shift is made by a pitch of one pixel as shown in FIG. 2B to obtain a monochromatic image data of only green color having the resolution of twice. As shown in Fig. 2C, the image is obtained by shifting seven times eight image data having different positions shifted in increment of 1/2 pitch of one pixel to make the resolution eightfold.

In contrast to Applicants' base claims 15, 21 and 25, what the Examiner alleges as "Applicant's Admitted Prior Art" (AAPA) synthesizes image data of all three colors of RGB to make a monochromatic image. According to AAPA, in order to improve the resolution of the monochromatic image, all color image data of RGB are formed by shifting the color imaging device and the object relative to each other by a distance of a pitch corresponding to each other.

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Specifically, as shown in a sequence of specific steps from FIG. 4A – FIG. 4B – FIG. 4C – FIG. 4D – FIG. 4D, individual high-resolution images of all three colors RGB are obtained by the image shift technique, and then a black-and-white monochromatic image data is generated by combining or synthesizing all three-color image data in the same position of three colors RGB, as described on page 4, line 28 to page 6, line 3 of Applicants' specification. As a result, while the monochromatic image is obtained, extra time of calculation is required because all 16 images are picked up at the same time for the three colors at each position. Therefore, "additional calculation time for generating a black-and-white monochromatic image is required for the acquisition of a three-color monochromatic image" as described on page 6 of Applicants' specification.

AAPA simply does **not** disclose that a monochromatic image is obtained by selected only one color of the color filter exclusive of other non-selected colors of the color filter, as expressly defined in Applicants' base claims 15, 21 and 25.

As a secondary reference, Endsley '613 does **not** remedy the noted deficiencies of AAPA in order to arrive at Applicants' claims 15, 21 and 25. This is because Endsley '613 only discloses a multi-mode digital camera with a computer interface, as shown in FIG. 1, in which the camera is operable in two modes of operation, still capture mode and motion capture mode, and the user is allowed to select operation between a host computer and the camera.

In Endsley '613, the capture mode includes a continuous mode and a single-shot mode. The color mode includes a color mode and a monochrome mode, as shown in Table 12 in column 5. The monochrome mode and the color mode are described in Table 3 in column 8 and from column 5, line 43 to column 8, line 6.

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According to Endsley '613, the continuous mode (configuration 0) is used first. In the case, the monochrome images are sent with 320X240 green pixels. The monochrome motion image is twice the frame rate of the color image.

On the other hand, as described in lines 58-62 of column 7, a color image is captured with 320x240 green pixels and 160x120 red and blue pixels. The number of pixels (the number of data) of monochrome motion image is half (1/2) of that of the color image. In other words, monochrome image is outputted with half (1/2) of the number of pixels of the color image. Accordingly, the monochrome image can be outputted half (1/2) the frame rate of the color image with half (1/2) the resolution of the color image, and, as a result, can be transferred at high speed.

In addition, the monochrome image according to Endsley '613 is only the green color to transfer at high speed by reducing the resolution to half (1/2) of the color image. In particular, using the crop value parameter, the selected starting and ending lines and pixels may be used to "crop" the image before being transferred in order to reduce the amount of data that has to be sent. See column 5, lines 48-52 of Endsley '613. As a result, the monochrome image can be transferred at high speed (high frame rate) with low resolution.

However, Endsley '613 does not disclose or suggest the features of Applicants' base claims 15, 21 and 25 relating to "shift drive means" or "shifting step". Therefore, even if the digital camera with features of Endsley '613 is to be incorporated into what the Examiner alleges as "Applicant's Admitted Prior Art" in the manner suggested by the Examiner, the Examiner's proposed incorporation still will not arrive at Applicants' base claims 15, 21 and 25, since neither Endsley '613 nor what the Examiner alleges as "Applicant's Admitted Prior Art" discloses or suggests

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the object of the present invention, that is, to generate a monochromatic image of high resolution in a short time using the image shift scheme.

In view of the basic deficiencies in what the Examiner alleges as Applicant's "Admitted Prior Art" and Endsley '613, and the lack of suggestion anywhere in the cited prior art to support the combination as suggested by the Examiner, Applicants respectfully request that the rejection of Applicant's base claims 15, 21 and 25 and their respective dependents be withdrawn.

Claims 16-20, 22-24 and 26-30, which depend from claims 1, 21 and 25, are deemed patentable from claims 1, 21 and 25 if their parent claims 1, 21 and 25 are patentable. Hartness Int'l. Inc., v. Simplicatic Eng'g Co., 891 F.2d 1100, 1108, 2 USPQ2d 1826, 1831 (Fed. Cir. 1987); In re Abele, 684 F.2d 909, 214 USPQ 682, 689 (CCPA 1982) *see also* In re Sernaker, 702 F.2d 989, 991, 217 USPQ 1, 3 (Fed. Cir. 1983).

Even assuming *arguendo* that independent claims 1, 21 and 25 are not patentable under 35 U.S.C. §102, which Applicants do not believe, claims 16-20, 22-24 and 26-30 are separately patentable from parent claims 1, 21 and 25 for reasons presented herein below.

For example, dependent claims 16 and 27 further define that "the color filter includes three types of color portions arranged according to a Bayer scheme". No where in either what the Examiner alleges as "Applicant's Admitted Prior Art" or Endsley '613, and the Examiner has **not** addressed any where in the final Office Action (Paper No. 17), is there any disclosure from the Examiner's proposed combination of Applicants' claimed "the color filter includes three types of color

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portions arranged according to a Bayer scheme" as defined in Applicants' claims 16 and 27.

Dependent claims 17, 18, 27 and 28 further define that "the predetermined pitch is a distance corresponding to $1/n$ (n is an integer) of a pixel on the imaging surface" and the "control unit repeats shifting by the distance corresponding to $1/n$ (n : integer) of the pixel in the imaging surface". Again, nowhere in either what the Examiner alleges as "Applicant's Admitted Prior Art" or Endsley '613, and the Examiner has **not** addressed anywhere in the final Office Action (Paper No. 17), is there any disclosure from the Examiner's proposed combination of Applicants' claimed "predetermined pitch is a distance corresponding to $1/n$ (n is an integer) of a pixel on the imaging surface" and claimed "control unit repeats shifting by the distance corresponding to $1/n$ (n : integer) of the pixel in the imaging surface" as defined in Applicants' claims 17, 18, 27 and 28.

In view of the foregoing explanations, and in view of the fact that the Examiner's proposed combination utterly fails to disclose and suggest key features of Applicants' dependent claims 16-20, 22-24 and 26-30, Applicants respectfully requests that the rejection of dependent claims 16-20, 22-24 and 26-30 be withdrawn.

In view of the foregoing explanations, and in view of the fact that the Examiner's proposed combination utterly fails to disclose and suggest key features of Applicants' dependent claims 16-20, 22-24 and 26-30, Applicants respectfully requests that the rejection of dependent claims 16-20, 22-24 and 26-30 be withdrawn.

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Lastly, claims 36-37 have been newly added to alternatively define Applicants' disclosed invention over the prior art of record. These claims are believed to be allowable at least for the same reasons discussed. In particular, new claims 36 and 37 define an apparatus for reading a document printed in black and white by using a color imaging device. In contrast to Applicants' claims 36-37, Endsley '613 discloses to transmit the image data of only green color as a monochromatic image of low resolution. In Endsley '613, as shown in Table #1, a capture mode includes a continuous mode and a single-shot mode and a color mode includes color and monochrome. As described in Table 3 and on column 5, line 44 to column 8, line 6, the monochrome mode is the continuous mode which is used when a moving image is picked up. As a result, Endsley '613 does **not** consider to pickup a document printed in black and white, which is **not** moving picture. Therefore, Endsley '613 does **not** disclose any technique reading a document printed in monochrome by the color imaging device and outputting a monochromatic image having high resolution.

INTERVIEW:

In the interest of expediting prosecution of the present application, Applicants respectfully request that an Examiner interview be scheduled and conducted. In accordance with such interview request, Applicants respectfully request that the Examiner, after review of the present Amendment, contact the undersigned local Washington, D.C. area attorney at the local Washington, D.C. telephone number (703) 312-6600 for scheduling an Examiner interview, or alternatively, refrain from issuing a further action in the above-identified application as the undersigned attorneys will be telephoning the Examiner shortly after the filing date of this Amendment in order to schedule an Examiner interview. Applicants thank the

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Examiner in advance for such considerations. In the event that this Amendment, in and of itself, is sufficient to place the application in condition for allowance, no Examiner interview may be necessary.

To the extent necessary, Applicants petition for an extension of time under 37 CFR §1.136. Please charge any shortage of fees due in connection with the filing of this paper, including extension of time fees, to the Deposit Account of Antonelli, Terry, Stout & Kraus, No. 01-2135 (Application No. 500.40886X00), and please credit any excess fees to said deposit account.

Respectfully submitted,

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